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By Electronic Filing

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

**Re: Sirius XM Written *Ex Parte* Presentation
ET Docket No. 18-295 & GN Docket No. 17-183**

Dear Ms. Dortch:

Sirius XM Radio Inc. (“Sirius XM”) hereby responds to the *ex parte* filing of The Boeing Company in the above-referenced proceeding addressing the risk of interference to incumbent licensed services¹ caused by unlicensed devices in commercial aircraft using the 5.925-7.125 GHz spectrum (“6 GHz band”). As discussed below, Boeing’s filing does not support its claims that user devices in aircraft would pose no interference threat to satellite services. Accordingly, the Commission should proceed, as it previously proposed, to prohibit unlicensed 6 GHz operations in aircraft and other moving vehicles.²

In its filings in this proceeding, Sirius XM has explained that aggregate emissions from unlicensed devices could disrupt its ability to provide continued, high-quality Satellite Digital Audio Radio Service (“SDARS”) to tens of millions of Sirius XM subscribers and other listeners.³ Most critically, the 7.025-7.075 GHz segment is the sole feeder link spectrum used to transmit programming to Sirius XM satellites and then to all SDARS users. In addition, Sirius XM receives a portion of its programming through conventional C-band satellites that have uplinks in the 5.945-6.425 GHz band, and Sirius XM also intends to use conventional C-band for telemetry, tracking and command (“TT&C”) during the orbit-raising phase following launch of its next-generation spacecraft.

¹ The Boeing Company, Oral *Ex Parte* Notice, ET Docket No. 18-295 & GN Docket No. 17-183, filed Apr. 5, 2019 (the “Boeing Submission”).

² *Unlicensed Use of the 6 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 18-295 *et al.*, 33 FCC Rcd 10496 (2018) (“Notice”) at ¶ 84.

³ See Comments of Sirius XM Radio Inc., ET Docket No. 18-295 & GN Docket No. 17-183, filed Feb. 15, 2019 (“Sirius XM Comments”); Reply Comments of Sirius XM Radio Inc., ET Docket No. 18-295 & GN Docket No. 17-183, filed Mar. 18, 2019 (“Sirius XM Reply Comments”).

Under the regulatory framework the Commission set forth in the Notice, unlicensed access points would “be prohibited from operating in moving vehicles such as . . . aircraft” based on its determination that allowing deployment of access points in vehicles would not “provide protection to incumbent services.”⁴ The Notice explained that signal attenuation from a vehicle’s structure “is likely to be significantly less than from a building and low-power access points could potentially cause harmful interference.”⁵ The Commission emphasized that it is “especially concerned about the interference consequences of allowing operation onboard aircraft because the longer line-of-sight distances from devices at typical aircraft altitude could result in interference over a wide area.”⁶ Sirius XM’s previous filings strongly support the Commission’s analysis on this issue, urging the Commission to adopt its proposed prohibition on in-vehicle deployment of unlicensed devices in the 6 GHz band.⁷

Boeing, by contrast, argues that barring unlicensed use in aircraft is unnecessary to ensure protection of licensed 6 GHz operations. The Boeing Submission claims that “satellite-based incumbent users of the 6 GHz band” such as Sirius XM “will be protected from any emissions from unlicensed 6 GHz devices operating inside aircraft because the upper surface of the aircraft fuselage provides [substantial] signal attenuation, on the order of 35 to 45 dB.”⁸ However, the very studies Boeing relies on in fact contradict this argument.

Most significantly, Boeing focuses repeatedly on the signal blockage provided by an aircraft’s fuselage, ignoring the much lower levels of signal attenuation through an aircraft’s windows. Boeing’s own data demonstrate that window-level attenuation is a fraction of that provided by the upper fuselage, in some cases as low as 0.7 dB.⁹ The International Telecommunication Union (“ITU”) report cited by Boeing suggests that attenuation from transmitters inside the cabin is 10 dB within plus or minus thirty degrees of the aircraft’s pitch axis.¹⁰

⁴ Notice at ¶ 84.

⁵ *Id.*

⁶ *Id.*

⁷ See Sirius XM Comments at 13-14; Sirius XM Reply Comments at 3-4, 10-11.

⁸ Boeing Submission at 2.

⁹ *Id.*, Attachment at 27.

¹⁰ *Id.*, Attachment at unnumbered page 8, citing ITU-R Report M.2283 on aircraft shielding, case 2. Both the ITU report and the Boeing data suggest that attenuation levels will be significantly higher for aircraft fitted with shielded windows. See *id.*, Attachment at unnumbered page 8 & unnumbered page 16. However, Boeing provides no data regarding the proportion of aircraft currently in use or planned for the foreseeable future that will employ such shielding, simply asserting that “many new aircraft” will have conductively coated windows. *Id.* The Commission cannot rely on such uncertain and unquantifiable future developments to safeguard the operations of licensed incumbents.

The Commission must use these lower attenuation values to assess the risk of interference to SDARS from unlicensed on-aircraft operations, since on a significant number of airline routes, laptop computers and tablets positioned on tray tables at window level will have direct line-of-sight to Sirius XM spacecraft. Sirius XM's filings in this docket have explained that its satellites have wide receive beams that cover the entire contiguous United States ("CONUS").¹¹ In both the northeastern and northwestern regions of CONUS, elevation angles to SDARS spacecraft are at or below thirty degrees and would therefore be within the range of emissions through windows evaluated in case 2 of the ITU report. These areas include six of the twenty busiest U.S. airports (John F. Kennedy, Newark, Seattle-Tacoma, Philadelphia, Logan, and LaGuardia), as well as the six busiest Canadian airports (Toronto, Vancouver, Montreal, Calgary, Edmonton, and Ottawa). On flights originating, terminating, or transiting over these areas, signals transmitting from passengers' user devices would be received at the SDARS space station antenna with only limited attenuation.

Moreover, relying on the results of the ITU report Boeing cites may substantially underestimate the risk of harmful interference to SDARS operations. Significantly, the ITU report evaluated Wireless Avionics Intra-Communications ("WAIC") systems, which "are not intended to provide communications with consumer devices, such as radio local area network (RLAN) devices that are brought onboard the aircraft by passengers or for in-flight entertainment applications."¹² The assumptions on which the ITU report was based, including the use of a thirty degree angle with respect to the aircraft's pitch axis, therefore do not reflect the proposed operating situation for unlicensed devices in the 6 GHz band. The actual angle within which a laptop or tablet placed on a tray table may have line-of-sight to a satellite through the aircraft window could be 40 or even 50 degrees. Using a higher angle would greatly increase the area in which in-flight use of unlicensed devices would pose an interference threat – indeed, elevation angles to SDARS spacecraft are at or below 50 degrees in all of CONUS except for the southern tip of Texas.

The cumulative effect of transmissions from multiple devices on multiple flights could pose a significant threat of harmful aggregate interference to SDARS feeder links, compromising service quality to tens of millions of subscribers and other listeners. In the same way, unlicensed operations by aircraft passengers in the conventional C-band could impair the integrity of programming delivered to Sirius XM in those frequencies and could endanger reliable TT&C during critical post-launch maneuvers for Sirius XM's future spacecraft. Such adverse effects

¹¹ See Sirius XM Comments at 8-9; Sirius XM Reply Comments at 4-5.

¹² Report ITU-R M.2283, Technical characteristics and spectrum requirements of Wireless Avionics Intra-Communications systems to support their safe operation (Dec. 2013) at 5 (emphasis added).

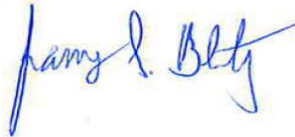
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would directly undermine the Commission's objective of protecting the continuity and reliability of licensed services in the 6 GHz band.¹³

In short, Boeing's assertions that use of unlicensed devices in aircraft would not pose a threat to licensed satellite services are not supported by the evidence Boeing presents. To ensure that Sirius XM can continue to deliver high-quality news, entertainment, sports, and public safety information to its U.S. listeners without disruption, the Commission must reject Boeing's proposals and implement a ban on 6 GHz unlicensed devices in aircraft and other vehicles, as proposed in the Notice.

Please address any questions regarding these matters to the undersigned.

Respectfully submitted,



James S. Blitz
Vice President, Regulatory Counsel

¹³ See Notice at ¶ 1 (the rules proposed by the Commission are intended to provide new opportunities for unlicensed use of 6 GHz spectrum “while ensuring that licensed services operating in the band continue to thrive”).